(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 224 902 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
24.07.2002 Bulletin 2002/30

(51) Int Cl.[7]: **A47L 15/42**

(21) Application number: **01205000.1**

(22) Date of filing: **19.12.2001**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **18.01.2001 IT MI010029 U**

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(54) Heating unit for dishwasher machine

(57) A heating unit (1) for a dishwasher machine is described comprising at least one filter (5) positioned on the bottom of a washing tank (2) of said dishwasher machine so as to collect and to filter the washing water contained in said tank, a tray (8) for the collection of the filtered washing water containing said filter (5), a suction duct (11) that takes such washing water toward a recycle pump (12). The unit comprises a heating element (20, 30) arranged around said filter (5) inside said tray (8) and fastened to the bottom of said tray (8).

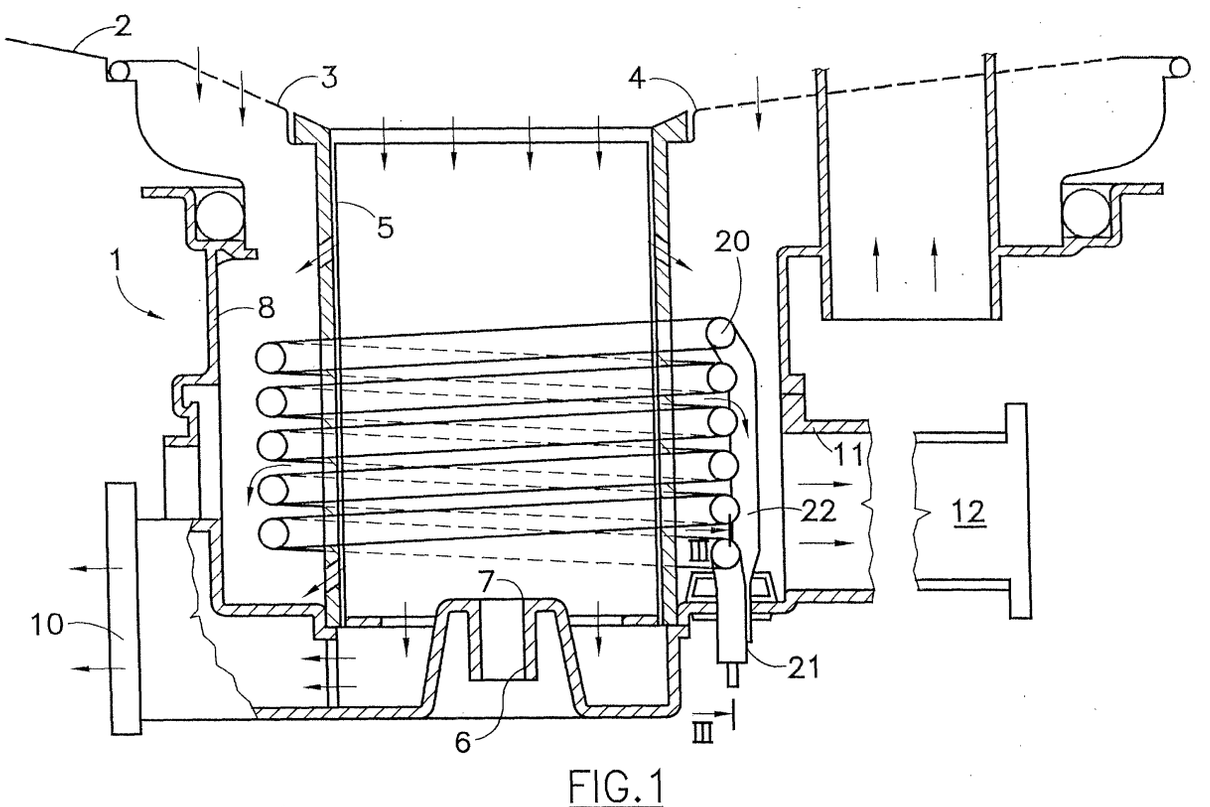

FIG.1

EP 1 224 902 A2

Description

[0001] The present invention refers to a heating unit for dishwasher machine.

[0002] Generally dishwashers that are currently in use are provided with units for the heating of the washing water. In some cases such heating units comprise armoured electric resistors that are positioned inside the washing tank and in particular on the bottom of the same, so as to be invested by the flow of washing water before the same flows toward a collection tray that is arranged on the bottom zone of the washing tank; in this way such resistors can provide a better function of heating of the air or the water. Such heaters get activated either in the washing stage of the dishes or in the drying stage of the same ones.

[0003] However such resistors capture dirt particles that by drying produce unpleasant smells and in addition, since they are located completely at sight, can cause burns to users due to the residual temperature that is present once the stage of washing or drying of the dishes is over.

[0004] In addition, the positioning of the resistors on the bottom of the tank hinders the flow of the washing water towards the tray for the collection of the washing water, thus creating sudden changes in the pressure of the water flow and by increasing the operating times of the washing or drying stages.

[0005] In view of the state of the art herein described, scope of the present invention is to provide a heating unit for dishwasher machine that solves some of the aforesaid disadvantages at least in part.

[0006] According to the present invention, such scope is attained by means of a heating unit for a dishwasher machine comprising at least a filter arranged on the bottom of a washing tank of said dishwasher machine so as to collect and to filter the washing water contained in said tank, a tray for the collection of the filtered washing water containing said filter, a suction duct that leads said washing water toward a recycle pump, characterised in that it comprises a heating element arranged around said filter within said tray and fastened to the bottom of said tray.

[0007] Preferably the heating element is positioned in equally distant way between the walls of the tray and the same filter.

[0008] Preferably the heating element is made up of an electric resistor that is wound around the filter in a spiral shape.

[0009] Owing to the present invention it is possible to provide a heating unit for dishwasher machine that owing to the positioning of the heating element around the filter allows an easier heating of the water as compared with the known heating units for dishwashers.

[0010] In addition, in a specific embodiment of such heating unit, the heating element is arranged near the filtering wall of the tank bottom so as to be usable also as a heater during the stage of drying of the dishes. The use of the resistor in the drying stage is to be meant only as a support for the main device for the extraction of the steam by fan or other system, for instance condensation fan. The resistor can be used at controlled temperature or with alternate operation sequences.

[0011] The arrangement of the electric resistor in a spiral shape around the filter makes the heating unit safe as regards the structure of the tray that is generally made of plastic since the resistor has a long extension and has a very low specific load.

[0012] During the washing stage the resistor is constantly run through by the recycle flow, maintaining the same as clean as possible, without any residual sediments.

[0013] The intermediate position of the heating element between the filter and the tray for the collection of the washing water, the diameter of the resistor and the relative spiral pitch, allow to carry the flow in a constant way without creating preferential flow streams and maintaining the area for the discharge of the washing water separate from the area for the recycle of the washing water thus preventing to recycle the washing water to be discharged.

[0014] The characteristics and the advantages of the present invention will become evident from the following detailed description of an embodiment thereof, that is illustrated as a non limiting example in the enclosed drawings, in which:

Figure 1 is a schematic view of one part of a dishwasher provided with heating unit according to an embodiment of the present invention;

Figure 2 is a schematic view of one part of a dishwasher provided with a heating element according to a variation of the embodiment of the present invention;

Figure 3 is a section view according to the line III-III of the part where the heating element in Figure 1 is fastened to the bottom of a tray for the collection of the washing water;

Figure 4 is a section view according to the line IV-IV of the part where the heating element in Figure 2 is fastened to the bottom of a tray for the collection of the washing water.

[0015] With reference to Figure 1 a unit 1 for the heating of the water in a dishwasher not entirely visible in figure is shown. Said unit 1 is located below the bottom 2 of a washing tank of the dishwasher that comprises a filtering wall 3 positioned on the bottom part of the washing tank and resting on borders of its bottom tank. Such filtering wall 3 has a hole 4 on its bottom part on the edge of which the upper ends of a cylindrical filter 5 that is open on top and open on the bottom rest. Said filter 5 is arranged inside a tray 8 for the collection of the filtered water; the filter 5 rests with its bottom on the tray 8. A tubular duct 6 positioned vertically on the bottom of the tray 8 and integral with it has one end 7 inside the filter

5 and it is predisposed for the cleaning of the filter 5. Indeed, inside the tubular duct 6 clean water flows that is conveyed on the walls of the filter 5 for the cleaning of the filter.

[0016] The tray 8 communicates with a discharge pump 10 and a duct 11 that takes the water to a recycle pump 12. Both the discharge pump 10 and the duct 11 are connected with the walls of the tray 8 which is connected on top with the tank bottom 2 of the washing tank of the dishwasher.

[0017] A heating element 20 for the water filtered by the filter 5 is arranged in a spiral shape around the same filter 5 within the tray for the collection of water 8 in equally distant way between the walls of the tray 8 and the same filter 5. Such heating element is generally made up of an electric resistor with a first terminal 21 fastened to the bottom of the tray 8, a single branch wound in a spiral shape around the filter 5, and a second terminal 22 that goes back in parallel way to the first one and that is also fastened to the bottom of tray 8, as visible in Figure 3. The electric resistor can be for instance of 1800Ω and it can generate a power of 3,5 W/cm^2. Such resistor allows a considerable exposure of heating surface to the flow of water coming from the filter 5 and, due to its position, it provides that only the water destined to be recycled through the recycle pump 12 gets heated and not the water that flows toward the discharge pump 10. In this way the resistor keeps the area for the discharge of the washing water, area that is mostly subject to the dirt, separate form the area for the recycle of the washing water thus preventing the recycle of the washing water to be discharged.

[0018] In figure 2 a heating unit according to a variation of the embodiment of the present invention is shown. Such unit differs from the unit in Figure 1 because the electric resistor which makes up the heating element 30 is made through winding in spiral shape around the filter 5 of two parallel branches of the electric resistor 30, whose terminals 31, 32 are both fastened to the bottom of the tray for the collection of water 8. The winding of the electric resistor 30 extends up to under the filtering wall 3 of the washing tank in such way that, for instance, with a motor-fan (not visible in the figures and known per se) serving as a main drying system, and a subsidiary duct for the intake of air 40, such electric resistor 30 can be used as heating unit for the drying of the dishes that are arranged inside the washing tank of the dishwasher. The electric resistor can for instance be comprised between 1800Ω and 2150Ω and can develop a power comprised between 3.5 W/cm^2 and 5.8 W/cm^2. The temperature of such resistor can be controlled by means of thermostat and the power supply of the resistor can take place either in continuous way or in discontinuous way.

Claims

1. Heating unit (1) for a dishwasher machine comprising at least one filter (5) positioned on the bottom of a washing tank (2) of said dishwasher machine so as to collect and to filter the washing water contained in said tank, a tray (8) for the collection of the filtered washing water containing said filter (5), a suction duct (11) that takes such washing water toward a recycle pump (12), **characterised in that** it comprises a heating element (20, 30) arranged around said filter (5) inside said tray (8) and fastened to the bottom of said tray (8).

2. Unit according to claim 1, **characterised in that** said heating element (20, 30) is arranged in an equally distant position between said filter (5) and the walls of said tray (8).

3. Unit according to claim 1, **characterised in that** said heating element (20, 30) is an electric resistor wound in a spiral shape around said filter (5).

4. Unit according to claim 3, **characterised in that** said electric resistor (20) comprises a single branch that is wound in a spiral shape around the filter and having a first terminal (21) fastened to the bottom of said tray (8) and the other terminal (22) that goes back in a parallel way to the first one (21) and fastened to the bottom of the tray (8) too.

5. Unit according to claim 3, **characterised in that** said electric resistor (30) comprises two parallel branches having the terminals (31, 32) fastened to the bottom of the tray (8) and both being wound in a spiral shape around the filter (5).

6. Unit according to claim 5, **characterised in that** said washing tank (2) is provided with a filtering wall (3) on its bottom having a hole (4) on the edge of which the upper ends of the filter (5) rest, said parallel branches (31, 32) of the electric resistor (30) being wound around the filter (5) in such a way so as to extend up to under said filtering wall (3).

7. Unit according to claim 5, **characterised in that** said dishwasher machine comprises a motor-fan within it and said unit comprises an air intake duct (40) so that the electric resistor (30) by means of said motor-fan allows the drying of dishes arranged inside the washing tank (2) of the dishwasher.

8. Unit according to claim 1, **characterised in that** said filter (5) has a fine mesh.

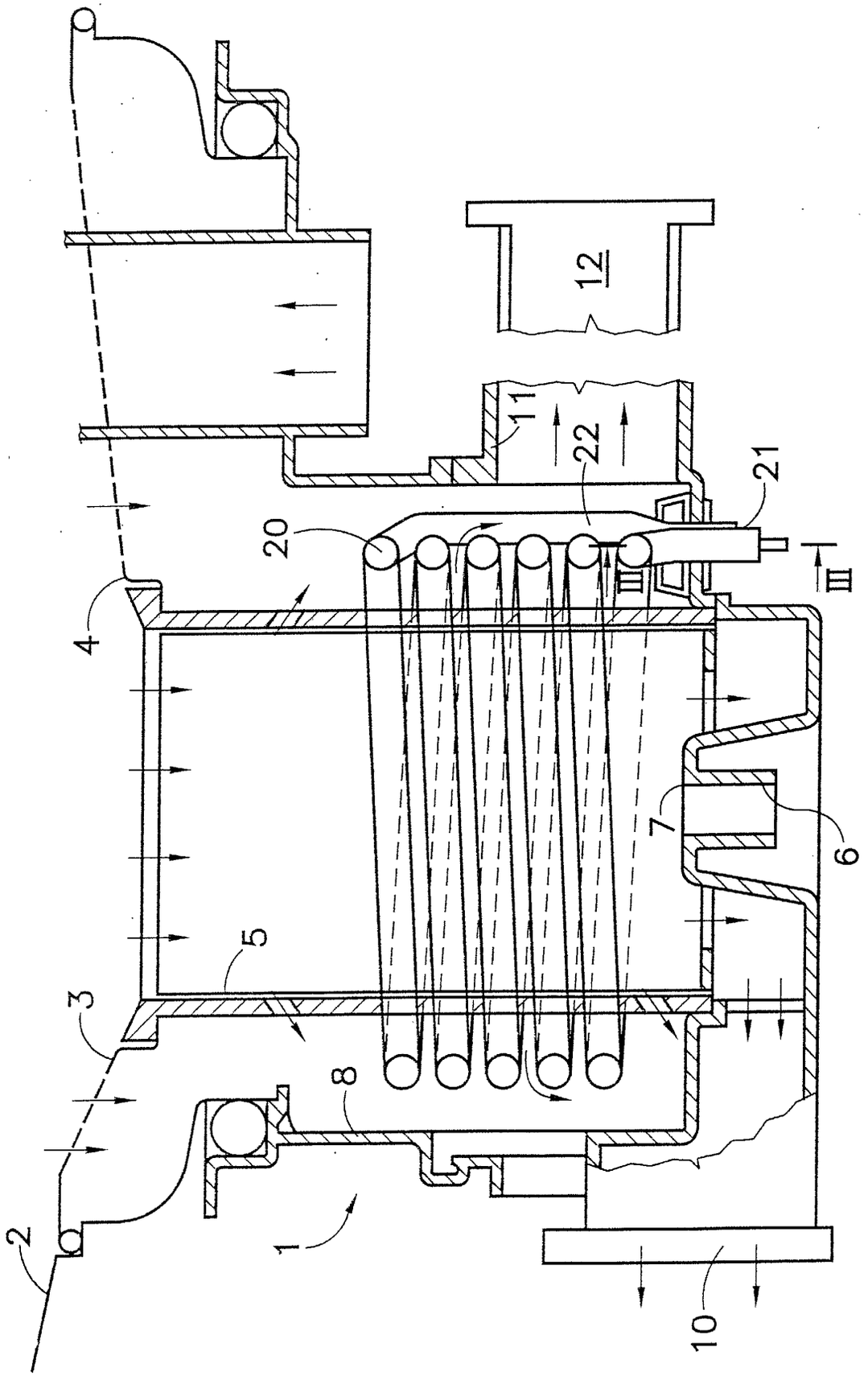

FIG.1

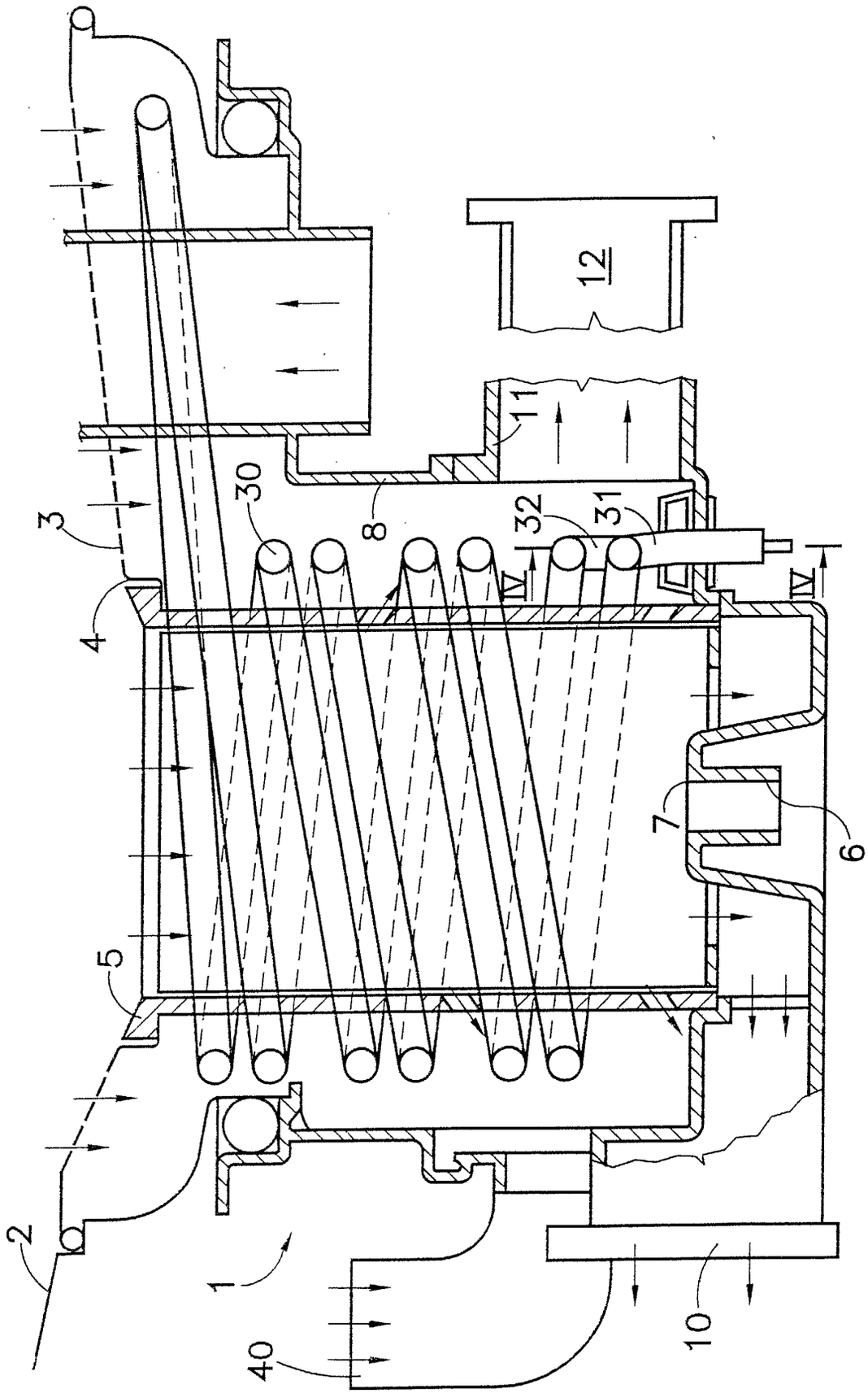

FIG.2

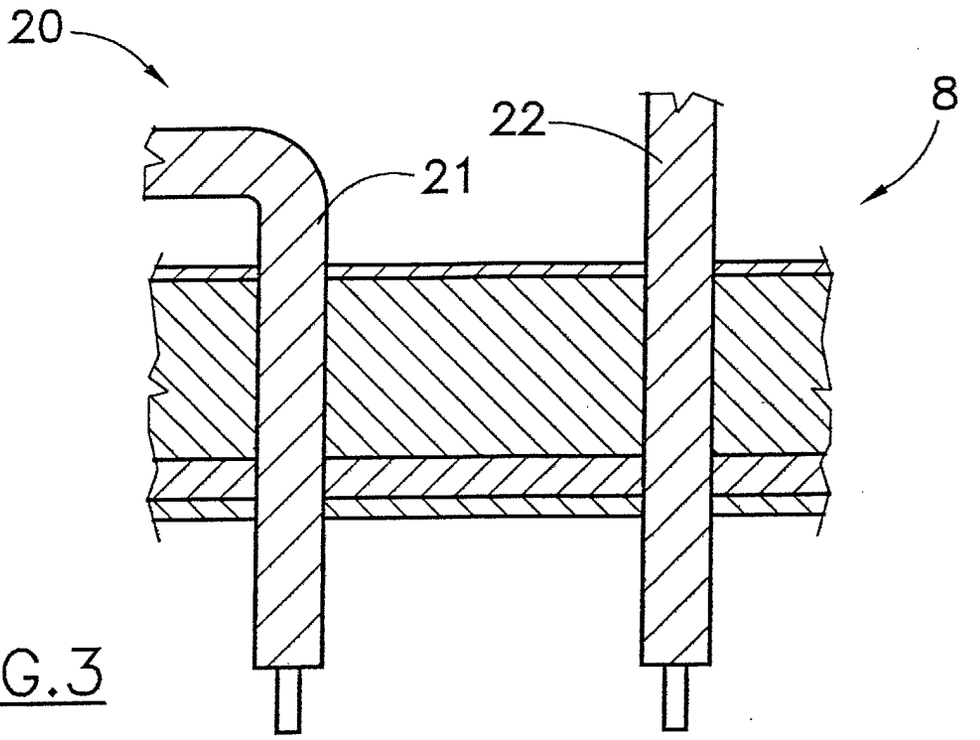

FIG.3

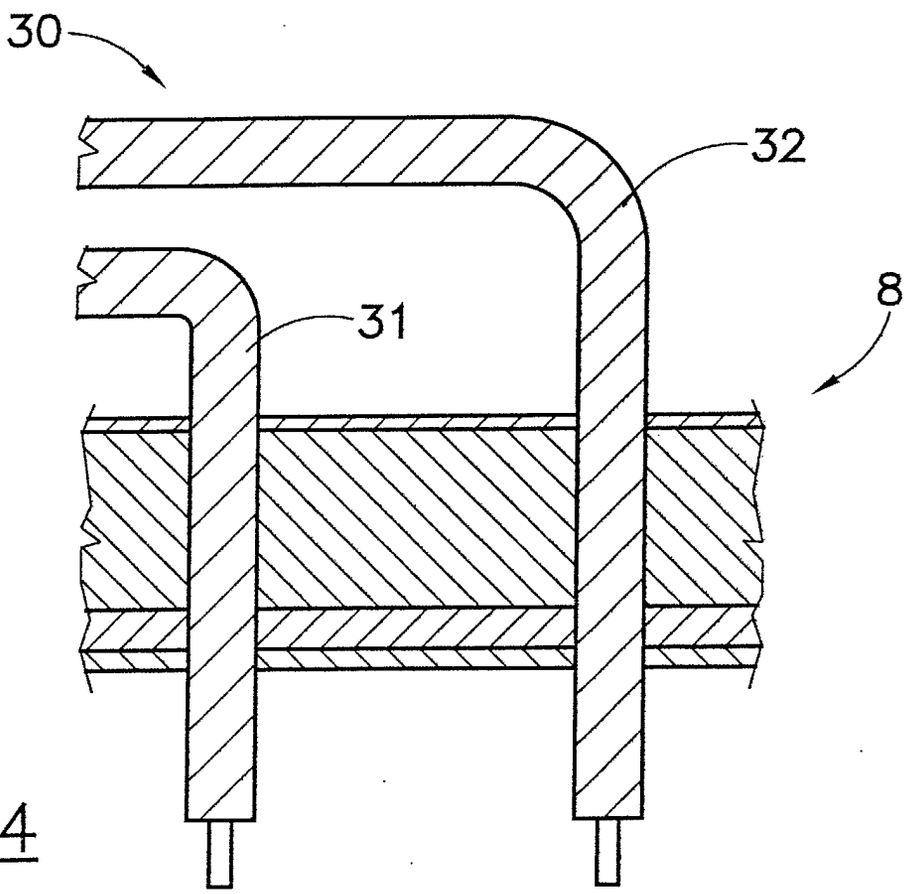

FIG.4